HARRIER NEST-SITE VEGETATION

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The Northern Harrier (*Circus cyaneus hudsonius*) is highly adaptive as a nester. It utilizes essentially all niches used by the three European harriers (*C. c. cyaneus, C. aeruginosus,* and *C. pygargus*) with the exception of the rather recent adaptation by *C. c. cyaneus* to forest nesting in Scotland (Watson 1977). The Northern Harrier has adjusted to significant changes in available vegetation for nest sites on the Buena Vista Marsh, Central Wisconsin, over the last 19 years. The plants recorded in the immediate vicinity of 184 Harrier nests reflect these changes.

Our 16,000-ha. study area lies mainly in the Buena Vista Marsh, but includes some of the surrounding upland. The marsh was drained, and both it and the upland parts of the study area are now mostly farmland with a high proportion of non-marshy grassland. The low spots tend to become sedge (*Carex* spp.) and willow (*Salix* spp.) swales (Hamerstrom 1969).

We recorded the three most prominent plants within approximately 2 ft. (ca. 60 cm) of the nest cup in order of dominance. Our primary purpose was to facilitate nest finding. We rarely measured vegetation height and density. The woody species, aspen and willow, were present as brush rather than trees. We could not identify sedges, goldenrods (*Solidago* spp.) and willows to species so lumped them as groups; some grasses were specifically recognized and are shown in Table 1, unidentified grasses are lumped together as a group (*Graminae*). Of different cover species or groups at 184 nests (Table 1) at least 16 were dominants. (We use the term "dominant" here to mean the single most prominent cover plant within 2 ft. of the nest.) The six most frequent dominants (i.e. at more than 5 nests) were willow (*Salix* spp.), grasses (*Graminae*), meadowsweet (*Spirea alba*), goldenrod (*Solidago* spp.), sedge (*Carex* and *Scirpus* spp.), and stinging nettle (*Urtica dioica*). Even when not dominant, these six were among the important cover plants at a disproportionate number of nests (Fig. 1). We recorded 56 nests surrounded by only one cover species, discounting those species present in only trace amounts (Table 1). All but three nests were in one of six dominant cover types listed above.

There has been a shift in the relative abundance of certain nest-site species on the study area, due in considerable extent to herbicide spraying to improve Prairie Chicken (*Tympanuchus cupido*) habitat. Changing patterns of farming have also played a part. Since 1959 the Wisconsin Department of Natural Resources has effectively sprayed a substantial portion of the study area to control brush. One result of this program has been a decrease in willows, which, along with sedge, was the most common vegetation at Harrier nests during the first half of this study (Period I: 1959–1968). But *Spirea* unex-

Table 1. Vegetation found in the immediate vicinity of 184 Harrier nests, 1959-1978.

Cover	Present at Nest Site		Dominant at Nest Site		Monotype at Nest Site[c]	
	N	%	N	%	N	%
Willow (*Salix* spp.)	65	35.3	40	21.7	15	8.2
Grasses (Graminae)[b] total	(58)	(31.5)	(42)	(22.8)	(23)	(12.5)
Timothy (*Phleum pratense*)	12	6.5	7	3.8	3	1.7
Reed-canary (*Phalaris arundinacea*)	6	3.3	3	1.6	1	.1
Poa ssp.	8	4.3	6	3.3	4	2.2
unidentified	32	17.4	26	14.1	15	8.2
Sedge (*Carex* spp., Scirpus spp.)	57	30.9	20	10.9	3	1.6
Goldenrod (*Solidago* spp.)	56	30.4	32	17.4	8	4.3
Meadowsweet (*Spirea alba*)	46	25.0	33	17.9	3	1.6
Stinging Nettle (*Urtica dioica*)	18	9.8	7	3.8	1	.1
Swamp Milkweed (*Asclepias incarnata*)	13	7.1	0	0.0	0	0
Aspen (*Populus tremuloides*)	10	5.4	2	1.1	0	0

Other species or groups found at nest sites (each found at less than five nest sites): Bluestem (*Agropyron smithii*); Redtop (*Agrostis alba*); Bluejoint (*Calamagrostis canadensis*); *Bromus* spp.[a] incl. *B. inermis*; Oats (*Avena sativa*[a]; Woolgrass (*Scirpus cyperinus*); *Polygonum* spp. incl. False Climbing Buckwheat (*P. scandens*); *Rosa* spp.[a]; Strawberry (*Fragaria* sp.); Raspberry (*Rubus* sp.)[a]; Yellow Sweet Clover (*Melilotus officinalis*)[a]; Dogwood (*Cornus* sp.); Wild Bergamot (*Monarda fistulosa*); Woundwort (*Stachys palustris*); Elderberry (*Sambucus canadensis*); *Aster* spp.[a]; Yarrow (*Achillea millefolium*); Thistle (*Cirsium* sp.); Fleabane (*Erigeron* sp.)

[a] Dominant at at least one nest.

[b] Parentheses show total of all grasses identified and unidentified.

[c] Plus Oats, *Bromus* sp., Raspberry, and Yellow Sweet Clover at one nest each.

pectedly increased. The Harriers adjusted to this change and nested more commonly in *S. alba* and also in *Solidago* spp. (Fig. 2) in the later years (Period II: 1969–1978). In this latter period, *S. alba* increased in dominance at nest sites by more than tenfold over the earlier period and increased by almost sixfold in the number of nests at which it was present. *Solidago* spp. showed a similar trend, whereas *Salix* spp., *Populus tremuloides*, and to a lesser extent *Carex* spp. declined. Fewer nests have been placed in grasses since Period I, particularly with grasses as the dominant cover.

By the time nesting Harriers have eggs—roughly the beginning of June—the most common cover plants of both Periods I and II (excluding some of the grasses) normally appear in tall or dense patches, or both. These characteristics may reduce exposure to both mammalian and avian predators. Dense patches of vegetation are not normally used for travel lanes by mammals. From the air the "hole in the field" is conspicuous, but the taller the vegetation, the more directly an avian predator must fly over a nest in order to see it.

Brown and Amadon (1968) report that Harriers commonly build their nests in low shrubby vegetation, tall weeds, or reeds rather than in very open sites. Our data agree, and also indicate that the Harrier is highly adaptive as a nester, as evidenced by its adjustment to the changes that have taken place on their breeding grounds on the Buena Vista Marsh.

Literature Cited

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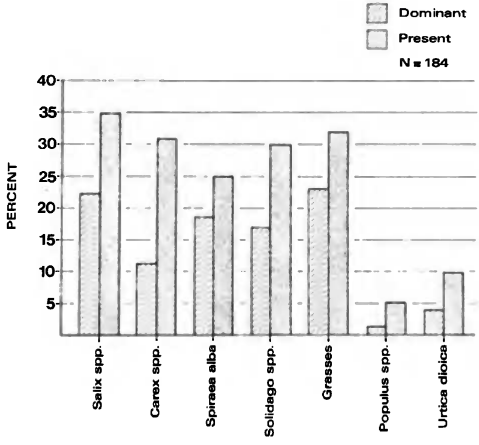

Figure 1. Percentage of nests at which each cover type was dominant or present.

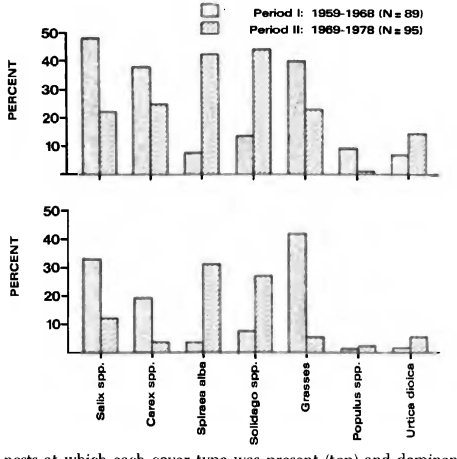

Figure 2. Fraction of nests at which each cover type was present (top) and dominant (bottom). The period 1959–1968 compared with 1969–1978.